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The quantum beating and its numerical simulation

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Quantum beating may nowadays refer to many, often quite different phenomena studied in various domains of quantum physics. A paradigmatic example is the inversion in the ammonia molecule, observed experimentally in 1935.
A theoretical explanation of the quantum beating was obtained by modelling the nitrogen atom as a quantum particle in a double well potential. The quantum environment of this particle can be modelled as a non-linear perturbation term added to the double well potential.

In this talk, I shall examine numerically the suppression of the quantum beating in a one dimensional non-linear double well potential, made up of two focusing nonlinear point interactions. The study of the Schroedinger dynamics is reduced to the study of a system of coupled nonlinear Volterra integral equations. I will show that already for a nonlinearity exponent well below the critical value, there is complete suppression of the typical beating behaviour characterizing the linear quantum case.

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